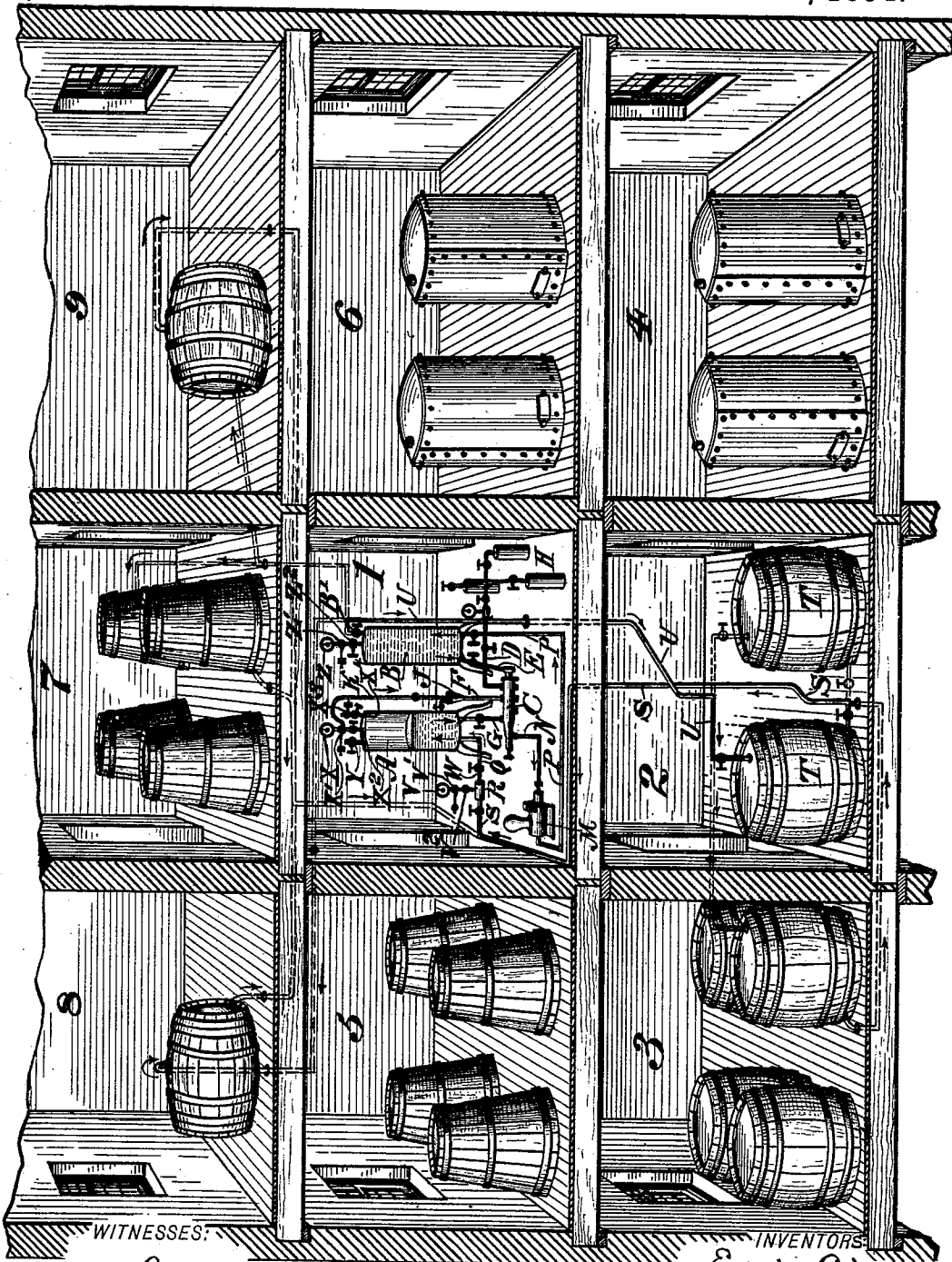


(No Model.)

E. ADAM & M. O. REHFUSS.
CHARGING AND COMBINING WORT, LIQUORS, &c., WITH CARBONIC
ACID GAS.

No. 513,858.

Patented Jan. 30, 1894.



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UNITED STATES PATENT OFFICE.

EDWIN ADAM AND MARTIN O. REHFUSS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO EDWIN ADAM, OF SAME PLACE.

CHARGING AND COMBINING WORT, LIQUORS, &c., WITH CARBONIC-ACID GAS.

SPECIFICATION forming part of Letters Patent No. 513,858, dated January 30, 1894.

Application filed December 23, 1892. Serial No. 456,144. (No model.)

To all whom it may concern:

Be it known that we, EDWIN ADAM and MARTIN O. REHFUSS, citizens of the United States, both residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Method of and Apparatus for Charging and Combining Wort, Liquors, &c., with Carbonic-Acid Gas, which improvement is fully set forth in the following specification and accompanying drawing.

Our invention relates to a process of charging and treating fermented or unfermented wort cordials, distilled liquors or other liquids with carbonic acid gas, which consists in drawing liquid from a tank, releasing it of pressure, then charging the same with carbonic acid gas, subjecting the charged liquid to a high pressure, then reducing the said pressure.

It further consists in displacing liquid from a high to a low pressure, or vice versa, then releasing the same of said pressures, charging the said liquid with carbonic acid gas, then compressing and combining the charged liquid under high, or combined high and low pressures while in motion, and maintaining the said high or low pressure after charging.

The drawing represents a perspective view in section of a building having in apartment or station 1, apparatus embodying our invention. 2, 3, and 4 represent the cellars of said building. 5 and 6 are the storage rooms on the first floor, and 7, 8, and 9 are the storage rooms on the upper floor, it being evident that other rooms may be employed.

Referring to the drawing: A designates the releasing and expanding tank, and B designates the high pressure combining and regulating tank.

T designates the low pressure combining vats or vessels.

C designates the charging apparatus which has its chamber therein similar to what is shown in the drawings of the application for Letters Patent filed by us on the 3d day of December, 1892, Serial No. 453,945, said apparatus having connected with it the pipes D, E, F, and G, the pipe D leading from the cylinders or tanks H, which contain carbonic acid gas. The pipe E leads from the bottom of the

vessel B. The pipe F leads from the injector J, connected with which is a pipe K leading from the top of the vessel A. The pipe G leads from the bottom of said vessel A, all as substantially shown in the aforesaid application.

M designates a pump which is connected with the charging apparatus by means of a pipe N.

P designates a pipe which leads from the pump M to the vessel B. Connected with the bottom of the vessel A by means of a pipe Q, is a low pressure regulating cylinder R, with which is connected the pipe S, the latter leading to the lower ends of the low pressure combining vats or vessels, T, and opening into the same. Leading from the heads of said low pressure combining vats or vessels T is a pipe U, which is connected with the upper end of the vessel B. The low pressure regulating cylinder R is provided with a liquid pressure gage V, safety valve V', valve or cock V², and the pipe Q has a regulating valve W connected therewith. The vessel A is provided with a gas pressure gage X, safety valve X', valve or cock X², adjustable blow-off valve X³, valve or cock X⁴, and a vent valve Y. The vessel B is provided with a liquid pressure gage Z, safety valve Z', valve or cock Z², and the pipe U has a regulating valve B' connected with it. The pipe D and connections of the same with the cylinders or tanks H, and the pipes S, U, D, K, P, G, are each provided with a valve or cock.

The operation is as follows: The vessels B and T are filled with a liquid to their utmost capacity, and the vessel A is only partially filled with a liquid. All of the cocks or valves are opened, and the pump M is started, whereby all air is expelled through the vent valve Y. A hydraulic pressure is then created on the liquids in the high and low pressure combining and regulating vessels B and T by means of the released liquid coming from the releasing and expanding vessel A, through the pipe G, into the end chamber of the charging apparatus C, then through the pipe N to the pump, and from thence through the pipe P into the vessel B, faster than the liquid that is forced out from said vessel B through the regulating valve B', thereby causing a high pressure on said liquid in the vessel B. The

liquid is then forced under said pressure from said vessel through the valve B', and through the pipe U into the low pressure combining vats or vessels T, and through the pipe S into the low pressure regulating cylinder R, and through pipe Q and regulating valve W, the displaced liquid passing through said valve W being discharged into the releasing and expanding vessel A where it is released of pressure. The valve W regulates the low pressure as desired, in the low pressure vats or vessels T. For high pressure, the pump is started, and the regulating valve B' is gradually partly closed until a hydraulic pressure of say twenty pounds is indicated on the gage Z, the speed of the pump being kept up. For low pressure, the regulating valve W is gradually partly closed until a hydraulic pressure of say ten pounds on the liquid in the low pressure combining vats or vessels T is indicated on the liquid pressure gage V. This at the same time causes the hydraulic pressure on the liquid in the vessel B to increase from twenty to say twenty-five pounds. By thus operating with these pressures, there is obtained the advantage of a full stream of liquid discharging into the releasing and expanding tank A, and a higher or lower pressure may be obtained by means of the valves B', W, and the speed of the pump M. After having regulated the high and the low pressure, then the main flow of carbonic acid gas is turned on, the same passing through the pipe D into the middle chamber of the apparatus C, and then charging into the liquid coming from the vessel B, through the pipe E into the inner chamber of said apparatus, the said charged liquid and gas being then sprayed or mixed into the liquid coming into and through the end chamber of the apparatus C from the vessel A, through pipe G, and passes through the tube N to the pump M, from whence it is forced through the pipe P into the liquid under a high pressure in the vessel B, where the charged liquid and gas becomes compressed and thoroughly combined, it at the same time displacing under said pressure, a portion of the high compressed and combined liquid into the low compressed liquid in the vats or vessels T, where it combines with its carbonic acid gas with the low compressed liquid, at the same time displacing under pressure, a portion of the low compressed and combined liquid in the vessel A, where it is released and expanded of its pressure and uncombined carbonic acid gas. This process is continued until the liquid in the vats or vessels T is sufficiently charged with carbonic acid gas, when then and there, it is confined under pressure until it is sufficiently combined, when it is ready to be handled for further use, or put into small packages.

We are aware that we have our applica-

tion Serial No. 453,945, filed December 3, 1892, pending, which is in part similar in construction to this application, the distinction however being evident, as in this case, we apply an additional tank or vessel, and methods for producing a low pressure on the liquid in said vessel after the same has been subjected to a high pressure. This method being for the purpose of charging liquids with carbonic acid gas quickly in vats or casks which will not stand a high pressure, as herein stated, the liquid after being charged with carbonic acid gas is subjected to a high pressure in a tank, then reduced to a low pressure in said vats or casks, said vats or casks containing pipes or branches having perforations or small openings for the purpose of distributing the charged liquid in the same.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The process of charging and treating a malt or other liquid with carbonic acid gas, consisting in drawing the liquid from a tank and releasing it of pressure, then charging the same with carbonic acid gas, subjecting the charged liquid to a high pressure, then reducing the pressure and returning it thus reduced to the said tank from which the liquid was drawn, substantially as described.
2. The process of charging and treating a malt or other liquid with carbonic acid gas, which consists in drawing liquid from a tank, releasing the liquid thus drawn of pressure, then passing the same into and through a gas charging apparatus where it is mixed with a small portion of liquid highly charged with carbonic acid gas, and subjecting the whole to a high pressure, and then reducing the pressure on said liquid, substantially as described.
3. An apparatus consisting of a releasing tank, a gas charging apparatus, a high pressure combining tank, and pipes connecting said apparatus and tanks, a low pressure combining vessel, and a pipe having a pressure reducing valve leading from said high pressure tank to said low pressure vessel, substantially as described.
4. An apparatus for the purpose set forth, having a releasing tank, a gas charging apparatus, high and low pressure combining vessels, and pipes connecting said devices with suitable attachments for regulating both high and low pressures in said vessels, and means for creating the said pressures in said vessels, substantially as described.

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Witnesses:

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